

*ANALYSIS OF THE EFFECTS OF TASK PREFERENCES, TASK DEMANDS,
AND ADULT ATTENTION ON CHILD BEHAVIOR IN
OUTPATIENT AND CLASSROOM SETTINGS*

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Two studies were conducted with children who displayed behavior problems to evaluate the effects of task preference, task demands, and adult attention on child behavior. In Study 1, we conducted brief functional analyses in an outpatient clinic to identify variables that facilitated appropriate behavior. For 8 of 10 children, distinct patterns of performance occurred; 3 children displayed improved behavior with changes in task demands, 1 child displayed improved behavior with a preferred task, and 4 children displayed improved behavior with changes in adult attention. In most cases, the children's parents carried out the assessments with adequate procedural integrity. In Study 2, we applied similar assessment methods to a classroom setting over an extended period of time. We identified independent variables controlling appropriate, on-task, and academic behavior for 2 children on two tasks, with slightly different treatment procedures across tasks for both children. In addition, the results of brief functional analyses for both children corresponded to the extended classroom assessments.

DESCRIPTORS: brief functional analysis, conduct disorders, outpatient clinic

Researchers have repeatedly demonstrated the utility of functional analyses for identifying variables maintaining aberrant behavior and for prescribing effective treatments (e.g., Carr & Durand, 1985; Iwata, Dorsey, Slifer, Bauman, & Richman, 1982; Iwata, Pace, Kalsher, Cowdery, & Cataldo, 1990; Mace & Lalli, 1991; Wacker et al., 1990). Most functional analysis studies have focused specifically on problematic behavior (e.g., self-injury) with severely developmentally disabled persons and have used analogue conditions to identify specific situations in which the behavior problems occurred. Following a functional analysis, typical practice is to "match" the treatment to the maintaining condition (Iwata et al., 1990).

Recent extensions of functional analysis research have shown the generality of the procedures in

outpatient clinics. Northup et al. (1991) assessed changes in aggressive behavior displayed by individuals with severe handicaps by manipulating the reinforcement contingencies delivered for both aggressive and appropriate manding behavior. For all 3 clients, changes in behavior corresponded to changes in contingencies within multielement designs. Derby et al. (1992) conducted a descriptive follow-up evaluation and reported similar results in about 50% of the 79 clients with severe handicaps assessed in an outpatient clinic.

Cooper, Wacker, Sasso, Reimers, and Donn (1990) and Northup et al. (1991) demonstrated that brief (90 min) versions of the procedures could be used to establish behavioral baselines of appropriate behavior sensitive to probe procedures. Cooper et al. (1990) extended this brief functional analysis procedure to children of average intelligence displaying problems in conduct who were referred for evaluation in an outpatient clinic. The children's parents conducted the assessments by varying the academic demands placed on the children and the amount of attention they provided for compliant behavior. Appropriate behavior corresponded to distinct assessment conditions within a multielement design. These results, like those of

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Northup *et al.* (1991) and Derby *et al.* (1992), demonstrated that outpatient assessments of severe behavior disorders did not need to rely solely on descriptive or indirect data, but that direct manipulation of independent variables was also possible. Follow-up by Cooper *et al.* (1990) further suggested that the treatments identified via the assessments were rated as effective by the parents.

Given the favorable findings from these investigations, further replication and refinement of the Cooper *et al.* (1990) procedures with children of average abilities or with mild handicaps in outpatient settings appeared to be warranted and was the major purpose of Study 1. In particular, we sought to assess the influence of another independent variable (task preference) in addition to task demands and adult attention. Task preference was included because previous research has shown that allowing students to choose a task activity and/or materials leads to better on-task performance and less disruptive behavior than when no choice is provided with the same assignments (e.g., Dunlap, Dunlap, Clarke, & Robbins, 1991).

Given that an ever-increasing number of independent variables might be assessed and that time constraints in outpatient settings will remain, a method for selecting which independent variables to manipulate is needed. In the absence of an empirical basis for selecting variables, a socially valid approach appeared to be to manipulate the variables in a hierarchical order, depending on the ease with which they might be manipulated by most parents. In Study 1, we assessed the effects of task preferences first because we hypothesized that a change in this variable would be easier to implement than a change in either task demands (requiring a change in instructional level) or adult attention (requiring more constant monitoring of child behavior). We assessed the effects of task demands next because, like task preference, treatment involved a manipulation of the task itself rather than a manipulation of adult behavior. Finally, we manipulated the level of adult (parent, and if needed, therapist) attention.

In addition to extending the outpatient clinic procedures, we evaluated their applicability to a

classroom setting in Study 2. Finally, we assessed the correspondence between the results of the brief assessment and the extended assessment.

STUDY 1

METHOD

Participants and Setting

The investigation included the first 10 children between the ages of 6 and 14 ($M = 9.5$) years who were regularly scheduled patients in the Behavior Management Clinic and who met the following criteria: (a) problems with conduct, such as noncompliance, aggression, and opposition, were displayed; (b) the primary concern of the parents was behavior problems at home or school; (c) intellectual functioning was within the mild range of mental retardation or above (8 were in regular education); and (d) the parents rated the problems as severe on the Revised Behavior Problem Checklist ($M = 1.950$ above the mean) (RBPC; Quay & Peterson, 1983).

The Behavior Management Clinic is a multidisciplinary clinic located in the Department of Pediatrics, The University of Iowa Hospitals and Clinics. Outpatient services are provided for a number of behavior problems, including noncompliance, temper tantrums, and hyperactivity. The standard evaluation conducted by the psychology team incorporated all protocols from the current investigation.

Measurement

Response definitions. There were three categories of dependent variables for child behavior: appropriate, inappropriate, and off-task. *Appropriate* behaviors included reading, relevant vocalizations in a low voice, following directions, eye contact with a speaker, working on assigned tasks, and asking questions relevant to the task or directions. *Inappropriate* behaviors consisted of swearing, hitting, kicking, throwing objects, tantrums, climbing on furniture, attempting to leave the room, loud vocalizations, refusing to perform a task, and asking questions irrelevant to the task. *Off-task* behaviors

consisted of looking away from the task, scribbling, or playing with a pencil. We considered inappropriate and off-task child behavior to be one class of behavior because both received the same consequences; therefore, to provide parents with instructions regarding their responses to these behaviors, we called inappropriate and off-task behaviors "inappropriate behavior."

Data collection. A trained observer collected data through a one-way mirror adjoining the interview room. The observer recorded data on parental behavior using a 5-s partial-interval recording procedure during 7- to 10-min sessions. The observer recorded data on the child's behaviors using a 6-s momentary time sampling procedure during the same sessions, such that recording of child behavior occurred after recording parental behavior for 5 s.

Procedural integrity. In addition to the dependent variable, the observers recorded four categories of parent interactions with the child: instructions, reprimands, praise, and other interactions. *Instructions* included directions regarding a task, corrective feedback about a task (e.g., "First write a four"), and prompts to perform the task (e.g., "Try the next one"). *Reprimands* consisted of corrective feedback regarding a child's behavior and included verbal statements (e.g., "Sit in your chair") and physical gestures (e.g., physically guiding the child to a chair). *Praise* consisted of positive responses about a child's behavior and included verbal statements (e.g., "Very good") and physical gestures (e.g., a hug). Finally, *other interactions* included activities and statements unrelated to the academic tasks or activities (e.g., play activities, talking about lunch).

Immediately before each assessment condition, the therapist briefly instructed the parent by first giving him or her a written statement to read to the child describing the activity and brief directions to remind the parent about the specific consequences to be delivered for the child's appropriate and inappropriate behaviors. After giving the instructions to the parent, the therapist said, "I am going to pretend to be your child, and you show me how you would respond in this situation." The

therapist assessed the parent's response to appropriate and inappropriate behaviors using a checklist and corrected errors before the beginning of each session. Instruction for the parent occurred in a second exam room away from the child, who remained in the testing room.

Interobserver agreement. A second independent observer collected interobserver agreement data on an average of 46% (range, 38% to 60%) of the sessions across conditions. Interobserver agreement was calculated separately for parent and child behavior on an interval-by-interval basis. Agreement was computed by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. Occurrence agreement for child behavior ranged from 83% to 99% ($M = 90\%$) and occurrence agreement for parent behavior ranged from 50% to 100% ($M = 71\%$).

Design

We presented experimental conditions according to a brief multielement design (Cooper et al., 1990). The first condition, baseline, consisted of free play. The second condition, high demand–low preference, always followed baseline. We considered these first two conditions to be control conditions because the best and worst behavior, respectively, should occur during each condition. The hierarchically arranged assessment conditions followed the control conditions in a sequential order. The order of conditions also depended on child performance within conditions. When a change in behavior occurred, a previously unsuccessful condition was immediately replicated, followed again by the effective condition. The only exception to this sequence occurred with Jay, whom parents described as "easily bored" and who was labeled as gifted. We expected good performance from Jay on high-demand tasks and poor performance on low-demand tasks, even if low-demand tasks were highly preferred.

Procedure

Task preference assessment. A therapist presented each child with groups of three randomly selected examples of math and reading tasks to

rank. Ranking occurred by presenting eight triads to the child (each example occurred four times) and saying to the child, "I want to know what kinds of things you like to do in school. Of these three tasks, which would you most like to do?" The therapist modified directions depending on the child's age and academic skills. After the child selected one of the tasks, the therapist asked, "Which of these three tasks would you least like to do?" Tasks were given rankings of 0 (least preferred) to 2 (most preferred). Ranking occurred at both levels of task demand, and a second naive therapist provided the tasks ranked highest and lowest again to the child and asked the child to select the most preferred tasks. No differences occurred in preferences across therapists.

Baseline (free play). The therapist gave the parent a written sheet that said, "Interact with your child, giving him or her positive attention, but only when your child shows appropriate or neutral behavior." The therapist then told the parent and child, "I need to do something else right now. I will be back shortly." The parent and child remained alone in the room with access to academic tasks and toys for the duration of the session.

High demand-low preference (HDLP). This condition consisted of difficult academic tasks ranked as least preferred by the child. The parent said to the child, "You are to work on this activity while I do something else." The parent sat across from the child, read a magazine or filled out a questionnaire, and provided no attention when the child worked on the task. If no inappropriate behavior was observed, the assessment was terminated, because the independent variables targeted for evaluation did not influence behavior in the clinic. For 2 of the 10 children, inappropriate behavior did not occur and the therapist discontinued the evaluations. Again, an exception to this procedure occurred with Jay, who performed well under high demands even though he was given nonpreferred tasks; the assessment conditions for Jay were HDLP followed by LDHP based on our hypothesis that demands, not preference, influenced his behavior.

High demand-high preference (HDHP). This condition consisted of difficult academic tasks ranked

as most preferred by the child. The therapist provided the parents with instructions identical to the high demand-low preference condition.

Low demand-high preference (LDHP). This condition consisted of academic tasks ranked as most preferred by the child. The therapist provided parents with instructions identical to the high demand-low preference condition:

Parent attention. The therapist provided the child with tasks from the best previous condition. If the child performed similarly on all previous tasks, the therapist assigned the HDHP task because the child often received age-level homework, and the parent typically had some control of the presentation of the material. The parent provided continuous attention (in the form of assistance or praise) to the child as long as the child displayed appropriate behavior, but ignored or turned away from the child for inappropriate behavior. At the beginning of this condition, the parent said to the child, "If you work on this task, I will help you."

Therapist attention. If no beneficial changes in child behavior occurred during the parent attention condition, a therapist repeated the attention condition, followed by a return to the parent attention condition and a second therapist attention condition to form a mini-reversal design. We conducted this condition to determine whether the child responded appropriately to the attention of others, as might be the case when the parent seldom delivered positive attention at home and the child had no history of receiving it from the parent.

Treatment recommendations. The entire assessment protocol required about 90 min to complete, after which an interdisciplinary (pediatrician, nurse, speech therapist, psychologist) meeting occurred. Staff members made recommendations for treatment based on all assessment data, including historical and parent interview data.

RESULTS AND DISCUSSION

The individual performance of the 8 children and their parents during the clinic evaluation is shown in Figures 1 and 2, with the overall results summarized in Table 1. Distinct patterns of performance occurred for each individual variable. Ted,

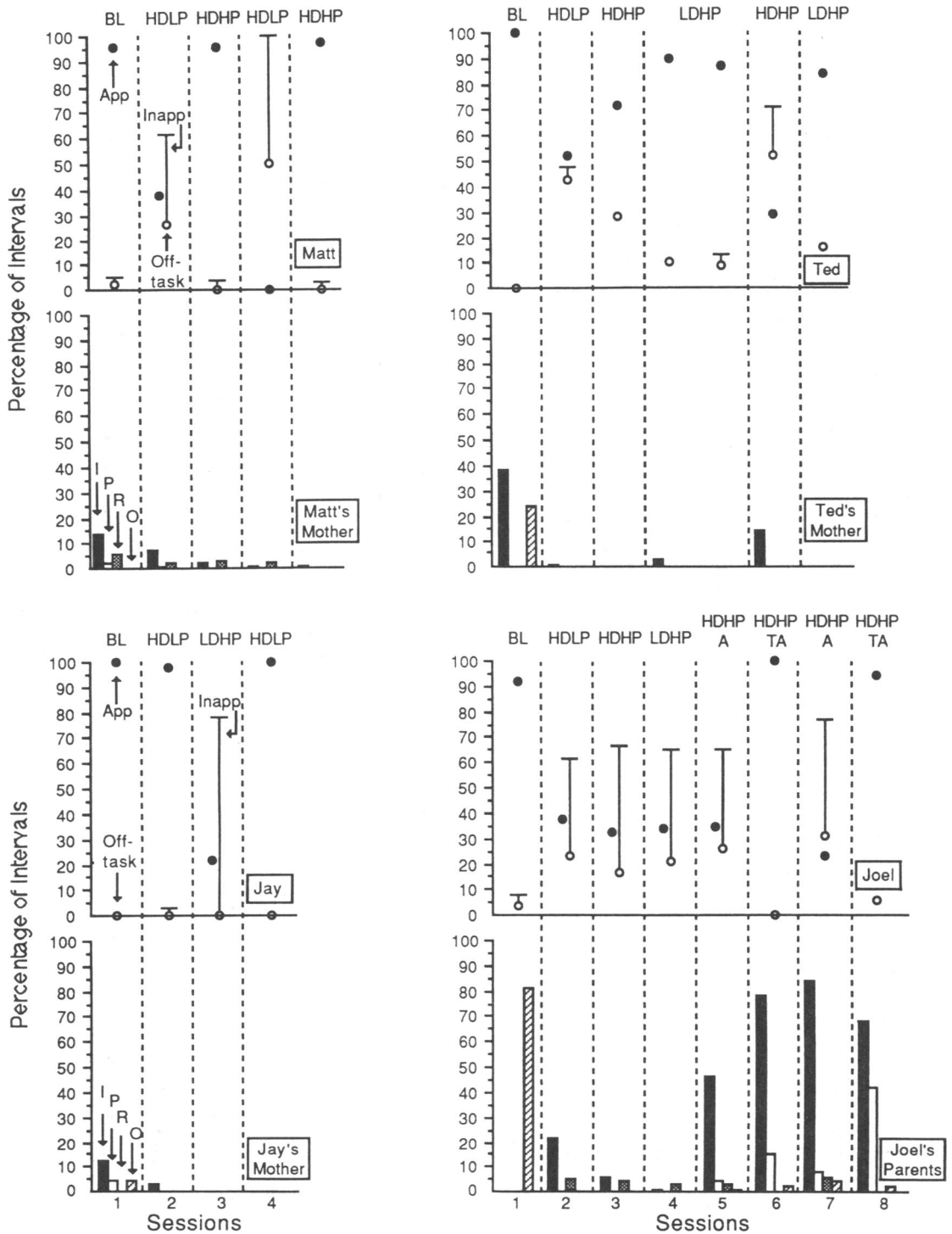


Figure 1. Percentage occurrence of child (top panel) and parent (bottom panel) behavior across conditions for Matt, Ted, Jay, and Joel. In the top panel, inappropriate behavior is added to off-task behavior and connected to form a cumulative total. In the bottom panel, I = instructions, P = praise, R = reprimands, and O = other interactions. For Ted, a 1-hr break was given after Session 4, and the LDHP condition was repeated prior to continuation of assessment.

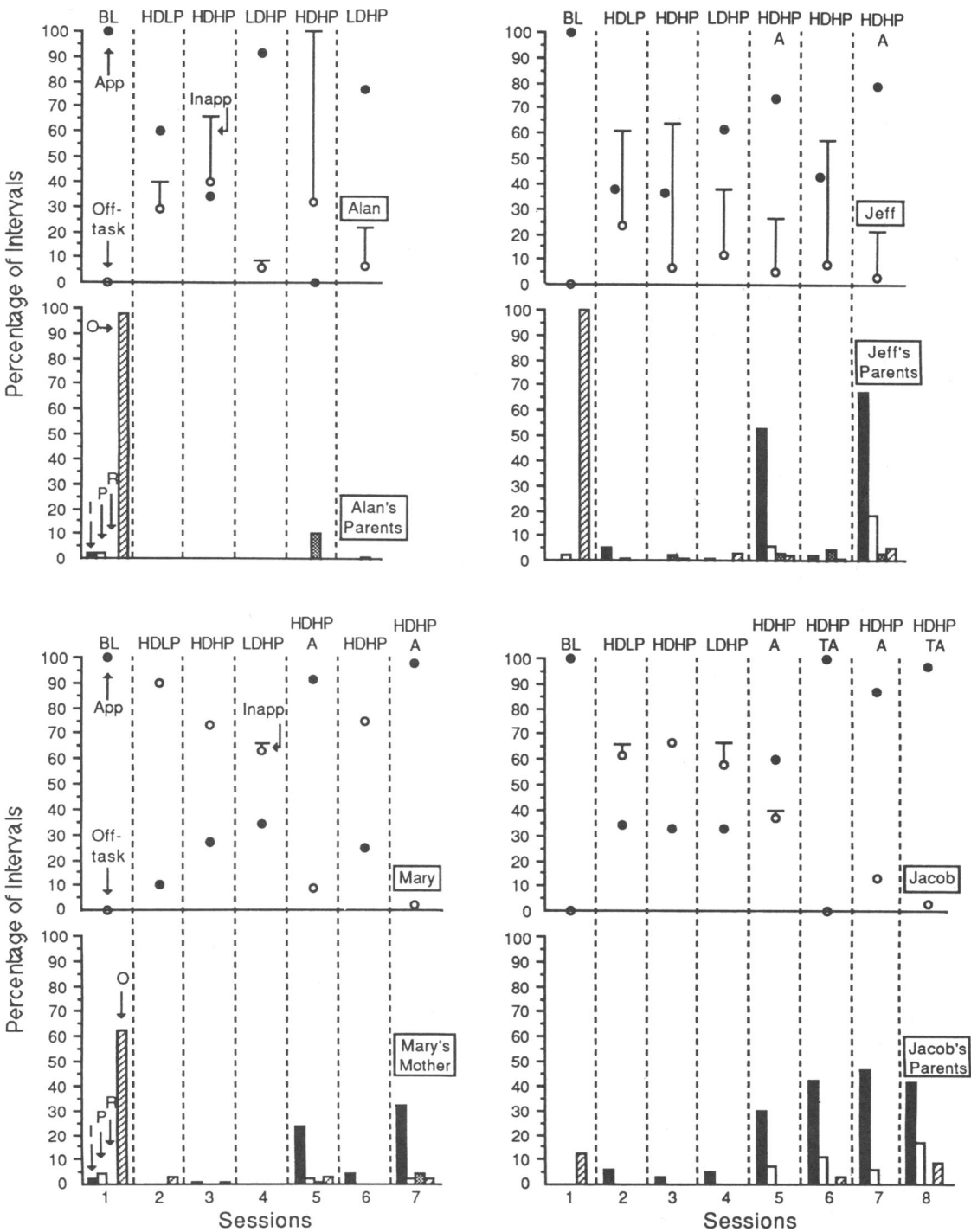


Figure 2. Percentage occurrence of child and parent behavior across conditions for Alan, Jeff, Mary, and Jacob.

Jay, and Alan responded best to level of demand ($M = 87\%$, 99% , and 84% , respectively), Matt to preference ($M = 97\%$), Jeff and Mary to parental attention ($M = 77\%$ and 95% , respectively), and

Joel and Jacob to therapist attention ($M = 97\%$ and 99% , respectively). We considered the results for therapist attention to be a default analysis because the therapist was not part of the child's nat-

Table 1
Summary of Diagnoses, Best and Unsuccessful Assessment Conditions, and Treatment Recommendations for Clinic Assessment

Child	Diagnoses	Best and unsuccessful assessment condition	Hypothesized operant mechanism	Primary treatment recommendation
Matt	Attention deficit hyperactivity disorder (by history), oppositional defiant disorder	HDHP/ HDLP	Positive reinforcement: tangible	Access to preferred activities contingent upon compliance to rules or requests
Ted	Mixed developmental disorder	LDHP/ HDHP	Negative reinforcement: escape from tasks	Goal setting within and among tasks
Jay	Attention deficit hyperactivity disorder (by history), oppositional defiant disorder	HDLP/ LDHP	Positive reinforcement: task completion (unclear)	Challenging tasks for unstructured times
Joel	Oppositional defiant disorder	HDHP-TA/ HDHP-A	Positive reinforcement: adult attention (inferred)	DRA/DRO, parent training
Alan	History of child maltreatment, adjustment disorder	LDHP/ HDHP	Negative reinforcement: escape from requests	Access to preferred activities contingent upon compliance to rules or requests
Jeff	Attention deficit hyperactivity disorder (by history), conduct disorder (by history)	HDHP-A/ HDHP	Positive reinforcement: parent attention	DRA/DRO, time-out
Mary	Mixed developmental disorder, developmental motor dyscoordination	HDHP-A/ HDHP	Positive reinforcement: parent attention	Functional communication training
Jacob	Developmental reading and language disorders	HDHP-TA/ HDHP-A	Positive reinforcement: adult attention (inferred)	DRA/DRO, parent training
Kevin	Mild/moderate mental retardation	NA	Not identified	Nonbehavioral
Joe	Anxiety and learning disorders	NA	Not identified	Nonbehavioral

ural environment and, thus, we inferred a maintaining condition. We speculated that an insufficient amount and quality of parental attention occurred in these cases. For both children, the therapists provided more praise than did the parents, and on an anecdotal basis, the praise delivered by the parents appeared to be neutral.

These results extend those of Cooper et al. (1990) by showing that both preference and examiner attention can result in improved performance. In addition, for the 8 children who displayed problematic behavior, we identified a maintaining condition for appropriate behavior and also achieved replication via the brief reversal.

As recommended by Iwata et al. (1990), the intervention packages were first matched to the results of the direct assessment (see Table 1). Thus,

we recommended differential reinforcement in the form of increased positive attention for children who performed best in the parent attention conditions (Jeff and Mary). We then used indirect data from the parent interviews and surveys to select the specific components of intervention (e.g., time-out for Jeff, functional communication training for Mary).

STUDY 2

METHOD

Participants and Setting

Two elementary-aged boys with mild handicaps served as participants. School records classified both students as having mild to borderline mental re-

tardation, but special education placement occurred, in part, due to noncompliant behavior. Both received services in the same special education classroom—a self-contained classroom with integration (SCI) into various regular education classes. The teacher referred these students to us because they displayed severe off-task or inappropriate behavior during academic activities.

Kurt was 9 years old, had been in the SCI classroom for 3 years, and received Ritalin® (10 mg b.i.d.) throughout the evaluation. His direct instruction in reading, math, spelling, written language, and social skills occurred in the special education classroom, and he was integrated into a regular third grade classroom for all other classes.

Derek was 8 years old and had been in the SCI program for 2 years. He received direct instruction in the SCI classroom for reading, math, written language, and social skills, and was integrated into a regular second grade classroom for all other classes.

The school, located in a semiurban setting, included approximately 400 students, kindergarten through Grade 3. The building was a “modified open setting,” with partitions and portable bulletin boards in place of walls. The SCI classroom, located in the center of the learning area, served 6 to 10 students. The multicategory program served students classified as learning disabled, mildly mentally disabled, behavior disordered, and physically disabled. During the assessment and intervention phases, the therapists observed each child in the morning or afternoon during the 30- to 45-min periods designated for independent work.

Measurement

Response definitions. A therapist recorded the same categories of dependent variables for child behavior (appropriate, inappropriate, off-task) recorded in Study 1 and also obtained probe data from the teacher on the percentage of the task the child completed and the accuracy of completed work. For Kurt, the therapist also obtained probe data on the percentage of time allocated to task engagement because of his slow work rate.

Behavior observations. The therapist, who was seated approximately 2 to 15 m from the child,

used the same observation procedures as in Study 1 to observe the child's behavior. The therapist recorded teacher behavior using a 5-s partial-interval recording procedure, and recorded the child's behavior using a 6-s momentary time sampling procedure during 10-min sessions.

Descriptive teacher ratings. To identify target behaviors and academic times for assessment and to obtain a measure of more global effects of the intervention, the teacher completed a rating form (developed by the therapists) for each child at the end of each academic period. The teacher assigned the child a rating of 0 if disruptive behavior occurred that required sustained intervention, a rating of 1 if disruptive behavior occurred but required brief intervention (e.g., a single prompt), and a rating of 2 if no problem behavior occurred.

Procedural integrity. The therapist recorded four categories of adult interactions as described in Study 1: instructions, reprimands, praise, and other interaction.

Interobserver agreement. The special education teacher and/or a research assistant collected interobserver agreement data on an average of 32% of the sessions within each assessment and intervention phase. Interobserver agreement was calculated in the manner described in Study 1. For Kurt, occurrence agreement for teacher behavior averaged 93% in math (range, 67% to 100%) and 84% in reading (range, 57% to 100%). The occurrence agreement for Kurt's behavior averaged 91% in math (range, 80% to 100%) and 91% in reading (range, 80% to 100%). For Derek, the occurrence agreement for teacher behavior averaged 85% in language (range, 66% to 100%) and 88% in reading (range, 72% to 100%). The occurrence agreement for Derek's behavior averaged 91% in language (range, 76% to 100%) and 91% in reading (range, 71% to 100%).

As a further measure of procedural integrity, the therapists computed means and ranges on a condition-by-condition basis across all four categories of teacher behavior on each task for both students. For Kurt, in math and reading (excluding criterion probes), the teacher provided instruction, praise, reprimands, and other interactions an average of 0% to 7% of the intervals across conditions. For

Derek, in language and reading (excluding criterion probes), the teacher provided instruction, praise, reprimands, and other interactions an average of 2% to 31% of the intervals across conditions, with greater percentage occurrence during high-attention than during low-attention conditions. (Specific integrity data are available from the first author upon request.)

Design

We used a combination multiple baseline (concurrent across tasks and nonconcurrent across students) and alternating treatments experimental design (Barlow & Hersen, 1984) to evaluate the effects of the independent variables on the dependent variables. The succession of treatment conditions occurred in a manner similar to that of Study 1 and was based on (a) the teacher's preference regarding the most convenient variable to manipulate and (b) the child's performance during the alternating treatments. The teacher chose to manipulate preference following baseline, and we compared high-preference tasks to low-preference tasks for both students within an alternating treatments design. After this comparison, we conducted different assessment conditions for each student, but because both students already received academic tasks well below their grade levels, no further reduction in demands occurred. Thus, for this study, we manipulated only those variables associated with preference and teacher attention.

Procedure

Task preference assessment. The teacher conducted the task preference assessment in the same manner as in Study 1, but the triads included tasks from the same academic subject (e.g., all reading tasks). Task preference assessment occurred at the beginning of each new unit within the academic subject. Weekly ratings of the high- and low-preference tasks showed stability in the rankings. Kurt always rated computer math and reading tasks as preferred, and Derek always rated computer reading tasks and language templates as preferred.

Teacher ratings. The teacher completed the rating form at the end of each academic period to identify target times and to provide a second mea-

sure of improvement in each child's behavior. The selection of target times and behaviors occurred on the basis of two sessions within an academic area given a 0 rating by the teacher. The most problematic times occurred during independent work for Kurt (reading and math assignments) and Derek (language and reading assignments), and the least problematic times occurred during group instruction in the same areas. The therapist averaged the teacher's daily behavior ratings across target areas and summed the ratings over a week's time for each child to compare across phases.

Baseline (high demand-low preference, HDLP). This condition consisted of academic tasks ranked as least preferred by the child and selected at the child's instructional level. The teacher provided the child with brief instructions regarding the task and ignored the child's behavior. The child worked independently during the condition for approximately 10 min per session. The teacher ignored inappropriate behavior, except to redirect the student, for example, back to his seat, and delivered praise or correction only at the end of the observation session.

Criterion probes. On an a priori basis, the teacher and therapist agreed that correspondence between performance in the problem subject area for 3 consecutive days and the students' average performance in the best subject area constituted the criteria for "successful behavior" on target tasks. The therapist collected probes periodically throughout baseline, assessment, and intervention conditions in the "best" subject area, and defined criterion behavior as the average of these probes.

Alternating treatments assessment (general). The initial assessment conditions occurred in the same manner for each child and consisted of comparing HDLP tasks to academic tasks ranked as most preferred by the child and selected at the child's instructional level (HDHP). The procedures occurred in an identical manner to the baseline condition.

After the initial alternating treatments assessment, we developed subsequent assessments based on (a) teacher preference, (b) the quality or quantity of work completed and allotted time used to complete the task, and (c) hypotheses generated by the

teacher regarding independent variables controlling behavior (Repp, Felce, & Barton, 1988). Assessment continued until each child performed at criterion in each academic area for 3 consecutive days.

The general procedure for the alternating treatments assessment included (a) initially comparing the first two treatment conditions (HDLP vs. HDHP) relative to each other and relative to the performance criterion, (b) generating the most likely hypothesis regarding why behavior did *not* occur at the criterion level, and (c) implementing a new assessment condition based on the hypotheses and comparing this new condition to the best condition observed during the previous assessment phase. Thus, both the conditions assessed and the number of assessment phases conducted varied across students and tasks.

For Kurt, the teacher hypothesized the operant mechanism to be negative reinforcement and, specifically, escape from *all* demands made of him by the teacher. Given that he already worked at a very slow rate, the teacher did not consider further reduction in amount completed as a viable intervention. Instead, the active component of the intervention package consisted of access to more preferred activities. For Derek, the teacher hypothesized the operant mechanism to be positive reinforcement in the form of teacher attention. We used these hypothesized mechanisms to guide the extended functional analyses.

Assessment for Kurt (math). We conducted three assessment phases (a) comparing performance on an HDLP task to the HDHP task, (b) comparing Kurt's performance on tasks he chose to complete to the same tasks assigned by the teacher (choice vs. no choice), and (c) augmenting the choice condition with a contingent "preferred activity" component; the teacher still permitted Kurt to choose the math task, but gave him a choice of other preferred activities (e.g., academic work on the computer) following the successful completion of the math tasks. If he did not complete the tasks as directed, the teacher assigned him a nonpreferred math task as a response cost.

Assessment for Kurt (reading). We conducted two assessment phases: (a) comparison of his per-

formance on an HDLP task to the HDHP task, and (b) access to a "preferred activity" in which the teacher gave Kurt contingent access to the more preferred reading task upon completion of the HDLP task.

Assessment for Derek (language). We conducted four assessment phases: (a) comparison of Derek's performance on an HDLP task to his performance on an HDHP task, (b) assessment of intermittent attention added to the HDHP condition (at least once during each of the sessions depending on teacher availability; attention averaged about 3 min during each session), (c) intermittent attention plus access to preferred activities with the teacher contingent upon appropriate behavior, and (d) 5 min of time-out for incomplete work, which involved using a folding screen to isolate Derek at his desk while he worked; the teacher removed the screen contingent upon completion of the assigned work and adequate quality of the work.

Assessment for Derek (reading). We conducted three assessment phases: (a) comparison of Derek's performance on an HDLP task with his performance on an HDHP task, (b) comparison of his performance when given intermittent attention on the HDHP task with his performance on the same task without attention, and (c) comparison of HDHP plus attention with a condition that provided access to preferred activities and increased teacher attention. In this last condition, Derek chose a preferred activity to work on for approximately 2 to 3 min with the teacher, contingent upon appropriate performance during the preceding HDHP plus attention session.

Intervention phase (general). We designed intervention strategies on the basis of the assessment condition that resulted in criterion performance. Intervention sessions occurred in the same manner as assessment sessions, except that the teacher incorporated the successful procedures into the curriculum for each task (independent and group work times) throughout the student's day. During intervention, the teacher carried out all procedures the same way as during assessment, except that the length of observation depended on the intervention

implemented. The teacher used instructional tasks during all intervention sessions.

Intervention phase for Kurt. For math, Kurt chose a preferred activity following completion of the assigned math task. Preferred activities included nonacademic tasks because the teacher did not generally give multiple math tasks to Kurt. If he adequately completed the task within the allotted time, he received access to the preferred activity. Incomplete work or failure to follow the teacher's directions resulted in correction of the assignment. The teacher did not need to assign Kurt nonpreferred tasks during intervention sessions.

Reading occurred early in the morning, following the assignment of the day's independent work sheets (in a folder kept at his desk). The teacher expected all work sheets to be completed during the day at seat work times. The intervention during reading consisted of Kurt choosing a preferred task assignment from his folder to be completed after completion of a reading task assigned by the teacher. Thus, any assignment (math, reading, language, etc.) could be chosen if he completed the initial reading task adequately within the allotted time. Failure to complete the task resulted in the teacher selecting the next assignment.

Intervention phase for Derek. Intervention for language consisted of approximately 3 min of attention and access to a preferred activity with the teacher (e.g., making a picture book) contingent upon completion of a specified number of problems within a task. Following 3 consecutive days of meeting the goal, the teacher increased the required number of problems by one until he completed an entire task; the teacher gradually required multiple tasks following 3 consecutive days of success. If Derek did not meet the task goal within the time allotted, the teacher placed Derek in time-out for 5 min.

Intervention for reading consisted of intermittent teacher attention and access to a preferred activity with the teacher contingent upon completion of a specified number of problems within a task. After 3 consecutive days of meeting the goal, the teacher increased the required number of problems by one until Derek completed an entire task; the teacher

gradually required multiple tasks following 3 consecutive days of success.

Maintenance. Beginning with intervention, we conducted 10-min probes of the target tasks (at least once a week) to assess the durability of the intervention effects. Maintenance probes continued until the end of the school year and occurred in the same manner as intervention.

Brief functional analysis. After the completion of all classroom procedures in Study 2, we conducted the 90-min assessment used in Study 1 with the 2 students in Study 2 and the teacher as therapist. A second observer, naive to the results or recommendations made during Study 2, collected interobserver agreement data in the same manner as Study 1 on three of the five conditions for Kurt and four of the seven conditions for Derek. Occurrence agreement for Kurt's behavior averaged 95% (range, 89% to 100%), and occurrence agreement for the teacher's behavior with Kurt averaged 82% (range, 82% to 100%). Occurrence agreement for Derek's behavior averaged 90% (range, 78% to 100%), and occurrence agreement for the teacher's behavior with Derek averaged 80% (range, 50% to 100%). We used the same procedures, design, and analyses as in Study 1 except for two modifications: (a) assessment conditions occurred in an area separate from the classroom (library) to approximate the clinic assessment conditions, and (b) the tasks used for the preference assessment included classroom language and reading tasks for Derek and classroom math and reading tasks for Kurt. After the assessments, the naive observer generated recommendations based on the assessment results to compare with those that actually occurred in the classroom. The naive observer, previously trained in the assessment procedures, graphed the results and wrote intervention recommendations.

RESULTS AND DISCUSSION

The results of the classroom evaluations conducted with Kurt and Derek are shown in Figures 3 and 4, respectively. Kurt's appropriate behavior during the baseline (HDLP) math tasks (flash cards) was variable (top panel of Figure 3) but was con-

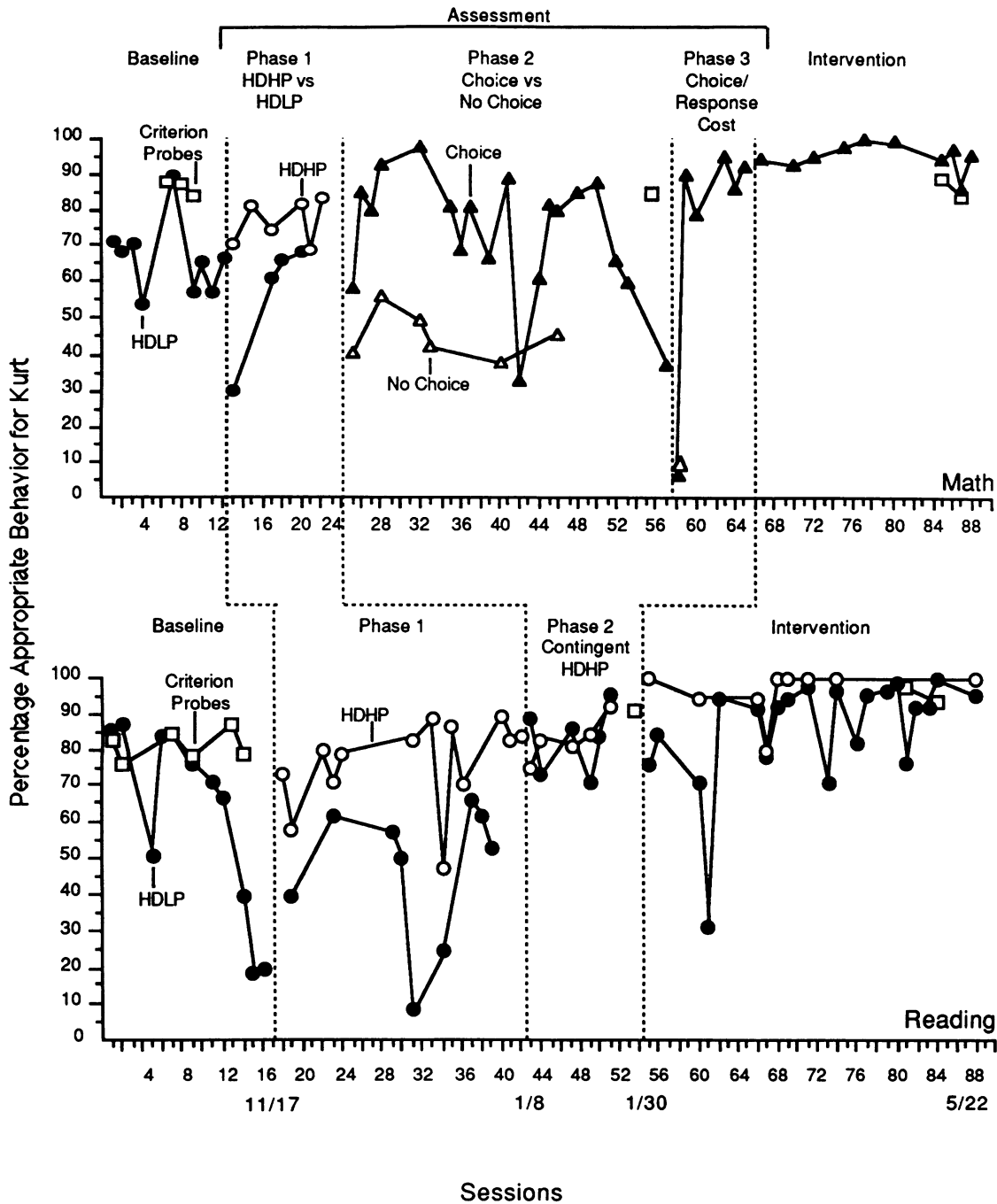


Figure 3. Percentage occurrence of appropriate behavior for Kurt across math and reading tasks.

sistently lower than his average performance on the criterion probes (86% on-task behavior in math group). During Assessment Phase 1, Kurt's performance improved ($M = 77\%$) when given more

preferred math tasks (computer). Given his improved performance plus teacher hypotheses, we selected "choice" as the variable for evaluation during Assessment Phase 2. With three exceptions,

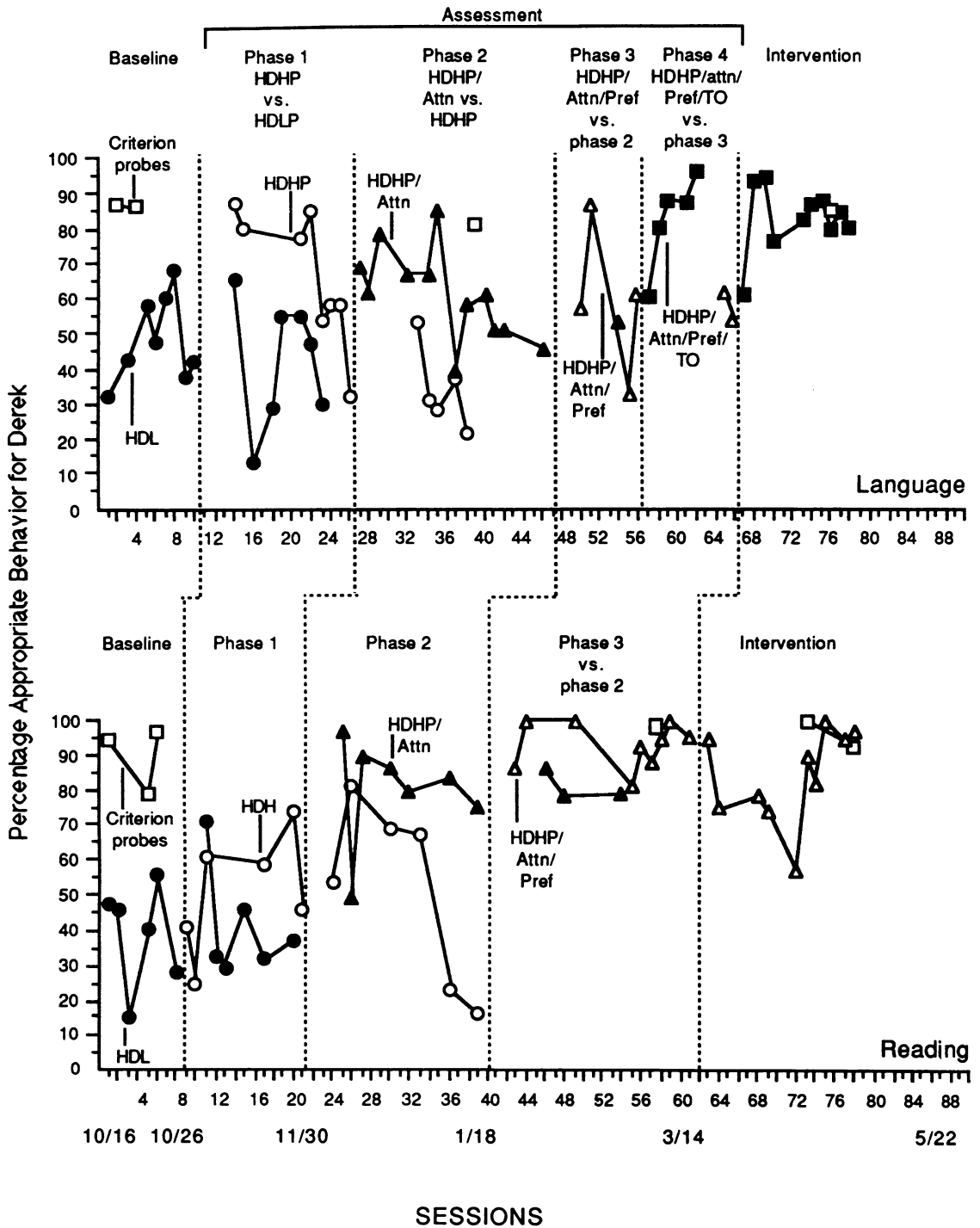


Figure 4. Percentage occurrence of appropriate behavior for Derek across language and reading tasks.

when given a choice, he always selected the preferred task identified during the preference assessment, and, in general, he displayed more appropriate behavior with the task he chose ($M = 73\%$) than with the tasks assigned by the teacher ($M = 45\%$). Therefore, in the third assessment phase, we augmented the choice condition with both a contingent preferred activity to reinforce appropriate behavior and a mild punisher (response cost was loss of choice). This combination of assessment components improved Kurt's appropriate behavior to criterion. He initially displayed poor performance, but quickly and consistently improved throughout assessment and treatment for approximately 10 weeks.

Similar results occurred for Kurt during reading (bottom panel of Figure 3). Kurt's appropriate behavior decreased across sessions when given the low-preference reading tasks, whereas his appropriate behavior averaged 81% during the criterion probes (direct instruction in reading). During Assessment Phase 1, Kurt's appropriate behavior was variable, but improved ($M = 76\%$) when given preferred reading tasks, and he met the established behavioral criterion during this phase. In the second assessment phase, we made access to the HDHP task contingent upon performance on the HDLP task, which resulted in criterion performance on both tasks. The teacher initiated intervention, and his performance remained high throughout the approximately 15-week duration of the intervention.

Derek's behavior in the low-preference (HDLP) condition on the language task was variable (top panel of Figure 4), but remained well below the established criterion (average of 86% on-task behavior during direct instruction in language). In the first assessment phase, appropriate behavior occurred more often when the teacher gave Derek the preferred language tasks ($M = 66\%$); however, a decline in appropriate behavior occurred across sessions.

During Assessment Phases 2 and 3, improved performance on the HDHP task occurred with intermittent praise or positive attention plus access to a preferred activity ($M = 80\%$), respectively; however, both conditions resulted in only a tem-

porary improvement in his performance. During the fourth assessment phase, when the teacher added brief time-out to the assessment package, his appropriate behavior reached criterion. When the teacher implemented the intervention, Derek's appropriate behavior remained fairly high and stable for approximately 7 weeks.

Similar results occurred in the first two assessment phases for reading (see bottom panel of Figure 4). As with the language assessment, Derek's appropriate behavior during baseline remained well below the criterion established for acceptable behavior (average of 90% during direct instruction in reading). During Assessment Phase 1, appropriate behavior during highly preferred reading tasks was variable, but, overall, improved in the preferred condition ($M = 51\%$). During Assessment Phase 2, intermittent attention, provided during approximately 30% of each session, improved Derek's behavior ($M = 80\%$). During the third assessment phase, access to both attention and preferred activities resulted in criterion performance. Although Derek's behavior was somewhat variable, it remained acceptable to the teacher for the 8 weeks of intervention.

For Kurt, probe data during baseline on math suggested that he used most of the time allotted, but he neither completed all of the tasks nor performed them accurately. During intervention, Kurt used less work time to complete assignments (average of 45% time used), but he completed a greater amount of work with improved accuracy (average of 93% and 91%, respectively). As with math, data collected during baseline on reading suggested that Kurt used all of the time allotted, but neither completed the work nor performed accurately. During intervention, Kurt used the least amount of work time for highly preferred academic tasks (average of 19% time used) and less time than in previous conditions for teacher-assigned reading tasks (average of 70% time used). In addition, the quality and quantity of work completed remained high (average of 85% and 91%, respectively).

Initially, Derek's amount of completed work and accuracy for language were good (i.e., averages of 100% and 94%, respectively); however, his ap-

propriate behavior did not meet the established criterion. In all four assessment phases, the amount of work completed and accuracy corresponded to his on-task behavior; however, the quality and quantity of his work varied across assessment phases during the other conditions. During intervention, Derek completed nearly all assigned work (average of 95% completion), with accuracy acceptable to the teacher (average of 79% correct), although lower than in baseline. This decline in accuracy may have been due to assignment of increasingly more difficult tasks.

During baseline in reading, he neither completed all of the tasks nor performed accurately. Overall, the amount of work completed improved across the assessment phases, with 100% of the work completed during intervention; however, the accuracy of tasks completed did not improve substantially until the intervention was implemented (average of 91% correct).

For both Kurt and Derek, improvements in teacher ratings occurred only with initiation of the final (successful) assessment phase, providing supporting data that overall improvement in behavior paralleled the independent variables. The sum of Kurt's average weekly rating was 5 (range, 4 to 6) during baseline, 4.3 (range, 0 to 6) during assessment phases, and 9.2 (range, 8 to 10) during intervention. The sum of Derek's average weekly rating was 5.4 (range, 4 to 6) during baseline, 4.5 (range, 2 to 6) during assessment phases, and 6.9 (range, 5 to 10) during intervention.

The results of the brief functional analyses are shown in Figure 5. Kurt's behavior improved when the teacher gave him preferred academic tasks, and a mini-reversal in behavior occurred with repetition of the less preferred and highly preferred tasks. Derek's behavior improved when the teacher provided attention for appropriate behavior; a mini-reversal in his behavior also occurred with repetition of the attention and no-attention conditions. These results corresponded to the results of the extended functional analysis.

The naive therapist made intervention recommendations for Kurt using the brief functional analysis based on the inference of an operant mechanism

of negative reinforcement. Recommendations included choice of task and access to preferred activities contingent upon appropriate behavior. The naive therapist made recommendations for Derek based on an operant mechanism of positive reinforcement; these included the use of differential reinforcement in the form of teacher attention for appropriate behavior. These recommendations corresponded to the results obtained from the extended classroom evaluations.

GENERAL DISCUSSION

We studied two potential extensions of functional analysis research with respect to both outpatient evaluations (Cooper et al., 1990) and to children with mild intellectual disabilities (Mace & West, 1986). Relative to outpatient assessments, the finding that task preferences, in addition to task demands and adult attention, showed a positive relationship to improved behavior in Study 1 for at least 1 child is important because it suggests the methodology reported by Cooper et al. (1990) can be changed to study distinctly different independent variables. An additional change to the procedures employed by Cooper et al. (1990) included the design selected for evaluation. In the Cooper et al. (1990) study, we achieved replication following the completion of all assessment conditions. In the current study, we achieved replication as soon as a positive change in child behavior occurred.

This change in design has both experimental and practical advantages. Experimentally, we prefer the current design to the Cooper et al. (1990) design because immediate changes in behavior occurred as a function of specified changes in defined independent variables. The practical advantage is that active treatment components can be identified more quickly. If, like Cooper et al. (1990), we attempted an assessment on all possible independent variables, replication would be difficult because of time constraints and child or family fatigue. In the current study, assessment ended when an effective treatment was identified. One change that should be considered for future studies is the procedure used

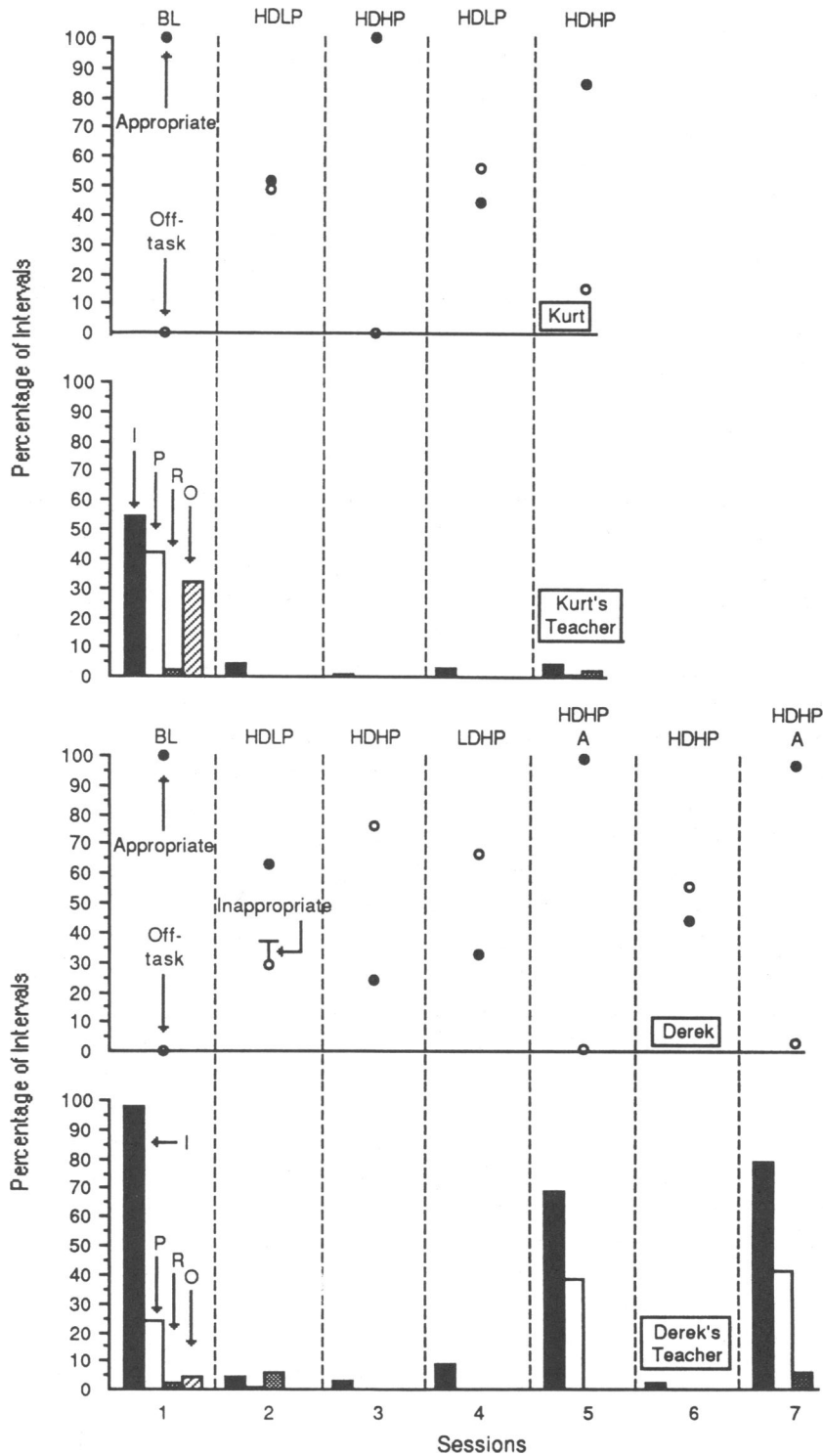


Figure 5. Percentage occurrence of child and teacher behavior during brief functional analyses for Kurt and Derek.

to determine the hierarchical assessment. Instead of the same order of conditions for all children, hypotheses (Repp et al., 1988) regarding independent variables might guide order of assessment conditions (as in Study 2) or parental acceptability (Reimers, Wacker, & Koeppl, 1987) of treatment options might be assessed first to determine the order of conditions.

The results of the brief functional analyses for both boys in Study 2 corresponded to the extended classroom assessments; however, the extended classroom assessments offered more specific information for the formation of intervention packages. For example, in the classroom assessment for math, Kurt's appropriate behavior improved when he was given a choice of math tasks, a choice of other preferred activities after completion of the math tasks, and response cost for failure to complete work as directed by the teacher. The brief assessment identified only "preference" as an active variable. Thus, the brief assessment was most useful for identifying the initial or general class (e.g., Iwata et al., 1990) of treatment needed, whereas the extended assessment was most useful for specifying treatment components. These results are comparable to those of Rodgers, Zarcone, and Iwata (1990), who reported that the brief functional analyses corresponded better to extended versions than did ratings or checklists of self-injurious behavior. The fact that both the brief and extended analyses in the present study resulted in similar findings provides further validity of the use of brief assessments such as those described by Northup et al. (1991) and Cooper et al. (1990).

In at least some cases, the brief assessment may be sufficient to initiate intervention. This analysis begs the question: Under what conditions is the brief assessment sufficient? There appear to us to be at least two conditions, each of which needs further study. First, the baseline of problematic behavior must be sufficiently stable to yield valid probes of independent variables. As suggested by Derby et al. (1992), this would require a behavior that occurs at a steady and high frequency and an independent variable that produces immediate and replicable results. Trends over time will not be

identified and, thus, some functions may be missed. Second, a brief assessment appears to be adequate when a skilled therapist or teacher is available to make needed changes in the intervention. The results of Study 2 suggest that the total "package" of treatment components will not be identified with a brief assessment. Anecdotally, we have noted this need for changes in intervention components as we follow up parents implementing the interventions at home. Importantly, changes in recommendations have almost always involved changes within a class of interventions and not changes to different classes of interventions (positive to negative reinforcement).

The evaluation of the durability of treatment in Study 2 provides further evidence that carefully conducted, extended functional analyses can identify interventions that produce long-term effects. In addition, multiple measures of the treatment effects indicated that the manipulation of the independent variables yielded multiple positive effects, including change in child behavior, task performance, and global teacher ratings of behavior on both target and nontarget tasks.

In Study 2, we combined hypothesis testing (Repp et al., 1988) with extended functional analyses. Although it was an effective approach, it was not efficient because at least 6 months were devoted to assessment. As suggested by Lalli, Browder, Mace, and Brown (in press) and Mace, Yankanich, and West (1989), one approach that appears to have important implications for school settings is "blending" assessment techniques. The blending of brief and extended evaluations seems to fit nicely with school psychology consultation. For example, an evaluation might begin with a descriptive assessment during naturally occurring classroom situations to identify potentially effective combinations of antecedents and consequences. Next, hypothesized effective intervention components might be evaluated via a brief functional analysis by the classroom teacher to confirm or disconfirm the hypothesized active variables and to identify classes of treatment. Finally, intervention would be implemented and specific adjustments made using an ongoing alternating treatments design.

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